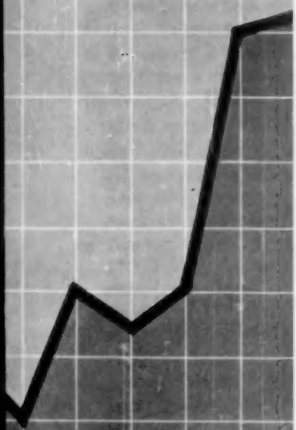
NEA

Research Bulletin



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Mathematics and Science

Despite shortages of teaching facilities, about 460,000 high-school graduates in 1957 had had at least three years of mathematics and about 485,000, at least three years of science

CURRENT secondary-school programs in mathematics and science involve significant numbers of all students, and graduate well-prepared "majors" in these fields. School people, however, are not content: There are grievous deficiencies in equipment and apparatus; well-prepared new teachers are hard to find; still more curriculum development is in order. These and other findings come from a current Research Division study.

More specific ones are:

- Fall 1957 *pre-sputnik* enrollments for all secondary-school students were: over 66 percent in mathematics; almost 60 percent in science.
- During their last four years about 175,000 June 1957 graduates had completed four or more years of mathematics. Some 460,000—*more than one-third* of all graduates—had taken at least three years.
- About 175,000 also had completed four or more years of science; 480,000, at least three years.
- Graduates from large schools offering many electives had had proportionately *more* mathematics, *more* science.
- Science teachers exceed mathematics teachers in hours of college training in their subject field.
- In the last two years 43 percent of all secondary schools completed programs of mathematics curriculum revision and 37 percent in science; 33 percent have added new mathematics courses and 23 percent new science courses.
- About 50 percent now have curriculm revision programs in process in each of these fields.
- Facilities for instruction lag behind modern concepts of instruction.

MATHEMATICS AND SCIENCE ENROLLMENTS

Junior high schools lead other types of secondary-school organization in mathematics enrollments—almost 97 percent of all students. This impact of heavy seventh- and eighth-grade enrollment carries over into junior-senior high schools and shows most markedly in the large schools of this type which so enroll over 7 out of 10 of all students.

Science enrollments lag behind mathematics enrollments in the junior high schools. Some 30 percent fewer junior high-school students take science than take mathematics.

Large high schools (1000 or more students) edge out small (under 300 students) and medium-sized schools (300-999 students) of this type with over 57 percent enrolled in mathematics courses. Differences in percentage enrollments among the three sizes of these schools are slight, however, and the over-all figure is 56.5 percent.

In science, also, senior high-school size makes only slight differences in proportions of enrollments—56.9, 55.5, and 55.6 percent respectively in the small, medium, and large schools, with an average for all of 55.9 percent.

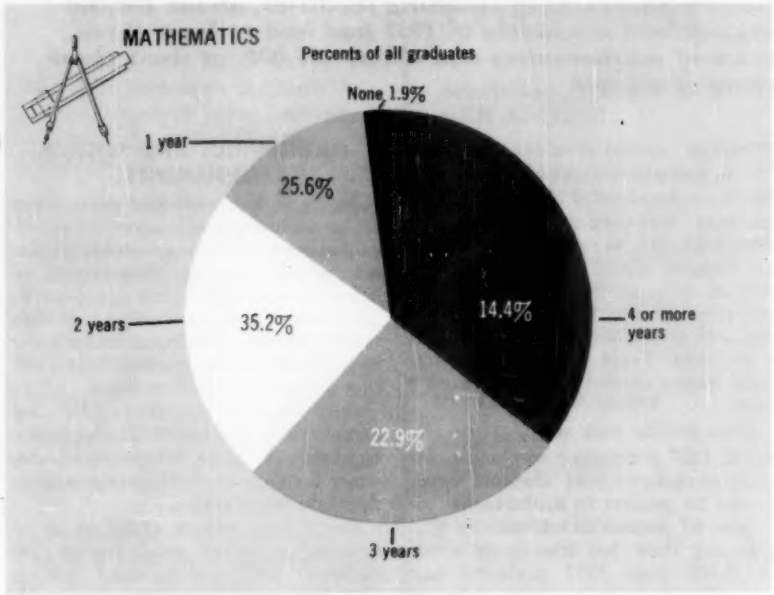
For *all* secondary schools, 66.2 percent of the students—some 6,235,000—were enrolled in mathematics; about 5,575,000, or 59.2 percent, in science.

GRADUATES WITH FOUR YEARS OF MATHEMATICS AND SCIENCE

A total of 14.4 percent of the 1957 high-school graduates had completed four or more years of mathematics with-

For further details see report to be published by the Research Division in the fall of 1958. Study is based on questionnaires circulated in March 1958.

1 YEARS OF HIGH-SCHOOL MATHEMATICS COMPLETED BY 1957 HIGH-SCHOOL GRADUATES



in the four years of high school, and 14.2 percent had taken four or more years of science within the same period.

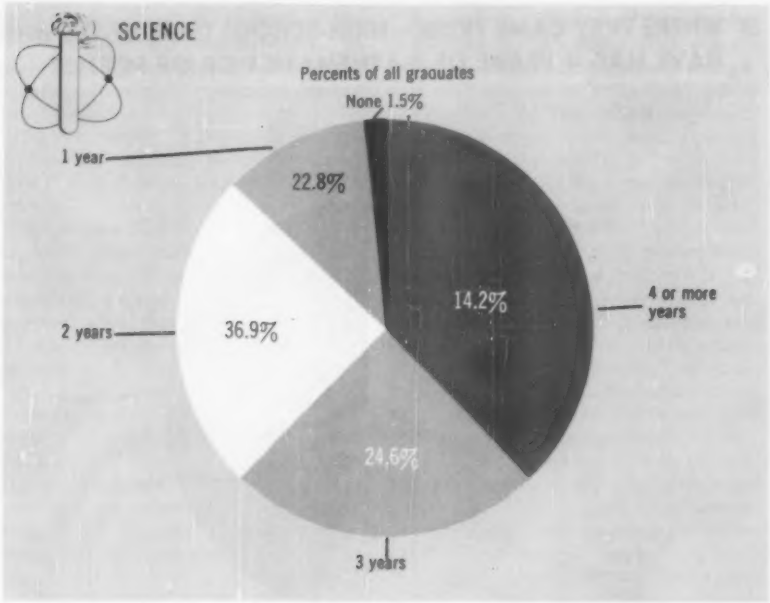
Probably many had taken four or more years of both subjects, but the extent of overlap is unkown.

Looked at in total numbers conservative estimates would go like this: In 1957 over 1-1/4 million were graduated from all public high schools. Of these, about 175,000 had had four or more years of mathematics and an equal group (to some but an unknown extent the same group), had taken four or more years of science.

About 460,000 of these graduates had at least three years of mathematics, and about 480,000 of them at least three years of science.

School size is a factor in intensiveness of training in mathematics and science. It is not evident in percentages of students who had taken these subjects for three years but less than four years, as these percents were just about constant, despite school size. But markedly in mathematics the percentage of graduates with *four* or more years moves up with school size—small, 9.7 percent; medium, 15.3 percent; and large, 17.3 percent. And since all schools report that about the same proportion of their graduates had been enrolled in a college preparatory program—about 51 percent—it becomes obvious that larger schools are affording their students opportunities for extra academic miles and that students are taking advantage of them. Put another way—while large schools have 1.25 times the enrollment of small schools, they graduate 2.1 times as many with four or more years of mathematics, and 1.9 times as many of their graduates go on to some institution of higher learning than is the case with small high schools. And since the large school has both the greatest number of elective offerings and the highest proportion of

2 YEARS OF HIGH-SCHOOL SCIENCE COMPLETED BY 1957 HIGH-SCHOOL GRADUATES



graduates with greater involvement in mathematics and science courses, it is obvious that so-called soft courses are not pulling students away from hard subjects!

MATHEMATICS AND SCIENCE TEACHERS

Science teachers are better prepared than mathematics teachers if 30 or more hours of college credit in the subject field may be used as a criterion. This level is met or exceeded by 60.4 percent of the science teachers and 40.9 percent of the mathematics teachers. This measure, however, may discriminate unfairly between the two groups as 30 hours of college mathematics may represent a greater depth in the discipline than an equal time in science.

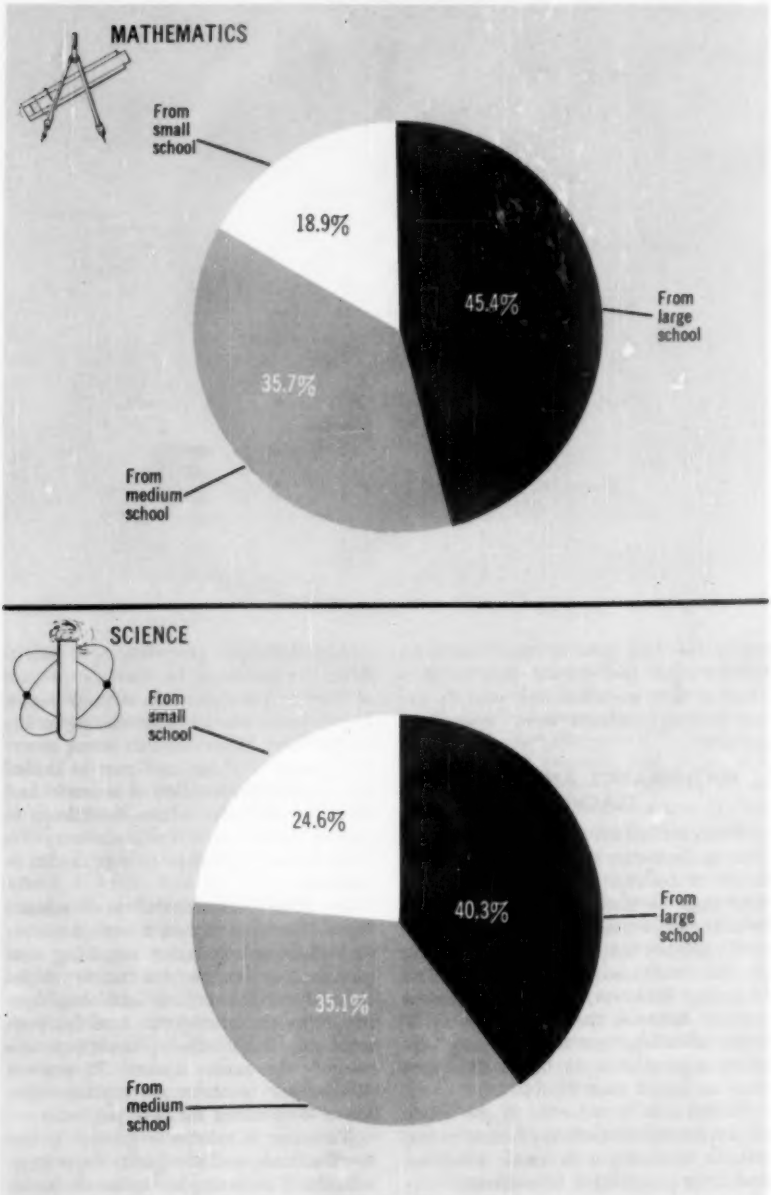
School size is a factor in the levels of preparation of both mathematics and science teachers, with small, medium, and large progression in evidence.

Low levels of preparation are statistically represented by the 8.7 percent of mathematics teachers in small junior high schools who have *no* college credits in the field. However, this is not to say that many of them may not be skilled and productive teachers of seventh- and eighth-graders, for whom workshops in modern arithmetic methods may be more to the point than college credits in calculus.

In both mathematics and science "new" teachers represent both turnover and program expansion requiring new positions—expansion due either to increased enrollments or additional emphasis on these subjects. And for both teaching fields the proportions are roughly the same: around 70 percent of the new teachers are replacements, about 30 percent fill new positions.

Turnover is relatively greater in the small schools; and new positions, in large schools. For example, in small junior

3 WHERE THEY CAME FROM—HIGH-SCHOOL GRADUATES WHO HAVE HAD 4 YEARS OF MATHEMATICS OR OF SCIENCE



high schools—almost 90 percent of the new teachers are replacements. In senior high schools only 47 percent are replacements and 53 percent represent new positions.

Science teacher turnover is highest in small high schools, 86.8 percent, and lowest in the large high school, 52.4 percent.

Preparation levels of new teachers are lower than those of the faculties receiving them. However, nobody knows how much college credit the oldtimers acquired after they went on the job.

Generalizations about the "older" teachers apply across the board for the "new" group. Large schools hire higher percentages with 30 or more hours of credit than smaller schools do. Science teachers still "outrank" mathematics teachers. However, when the two groups —old and new—are compared on the basis of *20* or more hours of college credit, the percents are just about the same.

Principals tend to see the science teachers as somewhat different from the mathematics teachers. As a whole, the principals stipulate "increased and more up-to-date knowledge of the field" as the prime need of science teachers. But for mathematics teachers they say "greater skill in instructional methods."

Principals of *large* schools, however, place "increased and more up-to-date knowledge" overwhelmingly first for mathematics teachers, too. However, an even greater proportion feel that this is a need on the part of science teachers. The "new" in mathematics does not seem to be so apparent as the "new" in science.

CURRICULUM REVISION

Mathematics and science curriculum revision is definitely a pre-sputnik phenomenon. Over half of all secondary schools have completed such projects in mathematics or science within the last two years—43 percent in mathematics, 37 percent in science, and 28 percent in both. Fifty-eight percent of them have such programs now in the works; 42 percent in both fields.

Large high schools lead in programs completed in both fields—69.3 percent in mathematics, 56.5 percent in science, and 48.5 percent in both. Small junior high schools lag with about one-fourth in each of these fields and about 17 percent in both.

Where emphasis has been put on only one subject, junior high schools have tended to stress science, while high schools have hit hardest at mathematics. Possibly this represents a trend in the whole secondary-school curriculum: providing an earlier start in science and stretching the range in mathematics.

Out of curriculum activities come new courses. The small-school trend is to add physics and chemistry, and solid geometry and trigonometry. Large schools list electronics, nuclear physics, college chemistry, college algebra, and calculus, and stress accelerated courses for the gifted. And particularly in the case of large schools, "courses planned" indicate a greater and greater awareness of the technical and professional needs of modern America.

NEEDED EQUIPMENT AND FACILITIES

Are the nation's mathematics classrooms equipped for a modern program of instruction? No, not in terms of basic facilities, let alone such "luxury" items (implicit in modern teaching) as calculators, adding machines, and comptometers.

Protractors and compasses are in but some 90 percent of all schools; geometric models, just 72 percent; graph boards, under 60 percent; large slide rules, 47 percent; adding machines, just under 40 percent; calculators, almost 14 percent; and comptometers, just over 10 percent.

Generally, large schools are more likely than small schools to have these facilities. Adding machines, comptometers, and calculators are more likely to be found in medium-sized junior-senior high schools than in schools of other types.

Science labs have their shortages. More than 6 out of 10 schools do not provide a microscope for each two biol-

ogy students in any classroom though about three-fourths of them do have a microprojector available to biology students in *some* rooms.

A wall chart of the elements published since 1951 would seem essential. But in 8.4 percent of the schools, not a classroom is equipped with this essential teaching aid. And 40 percent of the schools do not have a variable voltage control for their DC power supply in any of their physics labs. As a matter of fact, they do not have the DC power supply.

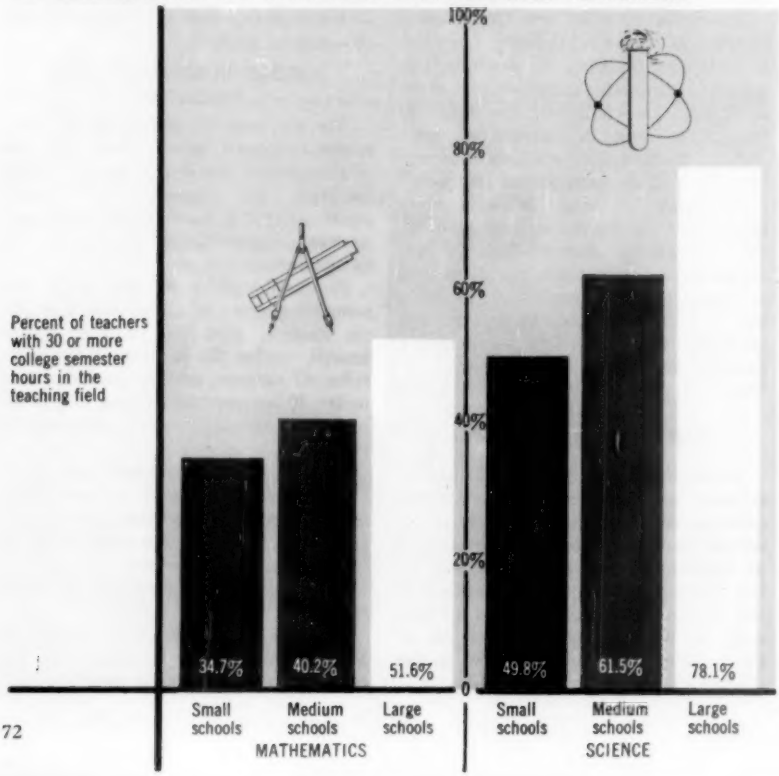
Concern for safety lags. In almost half of the schools all chemistry labs lack fume hoods and in more than one-third conspicuously posted safety warnings are conspicuously absent.

Again school size relates to adequacy of equipment. Large schools come closest to meeting standards; small schools are the farthest behind.

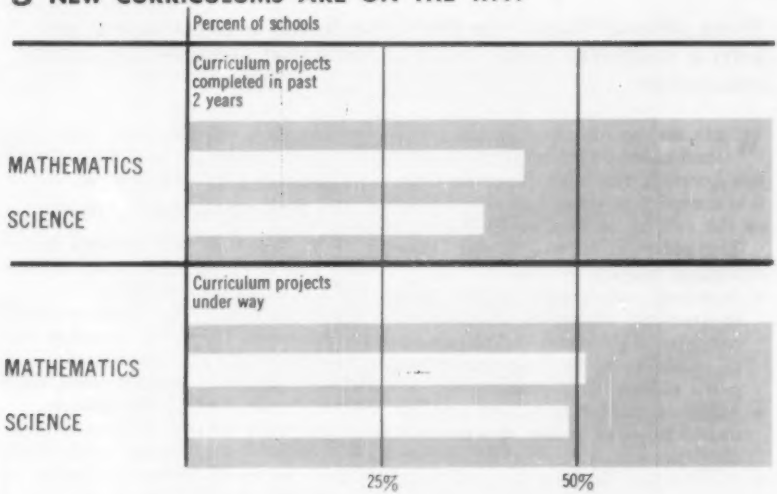
MONEY SPENT FOR SCIENCES

Secondary schools providing instruction in science are estimated to have spent close to $30 million in their last fiscal year for equipment, apparatus, and supplies. On an average, small schools spent $650, medium schools $1600, and large schools $4000. And about 70 percent of this was for new equipment.

4 LARGE SCHOOLS HAVE BETTER PREPARED TEACHERS



5 NEW CURRICULUMS ARE ON THE WAY



PROGRAM LIMITATIONS PRINCIPALS SEE

All schools report one or more serious limitations in their programs of both mathematics and science.

In mathematics, shortage of models and apparatus is mentioned most often, with student reactions involved in the next two items—not enough students want to take mathematics courses, and when they do they lack ability. Inadequate counseling and guidance services are also mentioned in this context. Lack of classroom space is another major grievance—so 3 in 10 schools report.

CONCLUSION

Public secondary schools are doing a far more comprehensive job in mathematics and science instruction than current discussions have assumed.

Percentages of students enrolled in both fields are high. Percentages of graduates with heavy credits in mathematics and in science are high. Two questions are pertinent: What are the manpower needs? What are the college opportunities?

Curriculum revision and provision of mathematics and new science courses increase. There are many evidences that revision means modernization.

Facilities for modern instruction are inadequate. Money is needed.

School size is closely related to scope and adequacy of programs. Opportunity for students is not equal.

The large comprehensive high school is the hero. Its many courses do not seduce bright youngsters. Rather, more of them are more likely to take the "tough subjects," *mathematics* and *science*.

THE MOST remarkable discovery made by scientists is science itself. The discovery must be compared in importance with the invention of cave-painting and of writing. Like these earlier human creations, science is an attempt to control our surroundings by entering into them and understanding them from inside. And like them, science has surely made a critical step in human development which cannot be reversed. We cannot conceive a future society without science.—J. Bronowski. "The Creative Process." *Scientific American* 199:59; September 1958.

Public Opinion on Education

Most people think the public schools are doing a good job; a majority favor federal financial support of public education

WHAT DO the American people really think about their schools? To answer this question, the NEA Research Division compiled reports of all major polls on the subject made since 1950.

The public opinion polls show five significant facets of opinion:

- A strong endorsement of the goals of American education: to create an enlightened electorate and to provide all children with an education appropriate to them as individuals.
- A general lack of agreement on what should be done to remedy curricular deficiencies.
- A conviction that the value of practical training is greater than liberal education.
- Evidence that educators are more demanding of American education than is the general public.
- An overwhelming majority opinion in favor of federal financial support.

THE "LIFE" POLL

The earliest poll studied was conducted in 1950 for *Life* Magazine by Elmo Roper. When questioned about the public school system in the home community, 71.6 percent were either very satisfied or fairly well satisfied. Only 16.8 percent expressed dissatisfaction.

Other questions concerned the importance attributed to the teaching profession (almost one-third considered teachers the most important contributors to community life), the value of the subjects taught (67.0 percent judged today's subjects more valuable than those taught 20 years earlier), the relative value of various elements of the curriculum (only 13.4 percent thought academic background was the most important feature), and whether more money should be spent for higher salaries or for new buildings (31.0 percent favored increased salaries, 28.2 percent favored increased allotments for school buildings, and 21.9 percent recommended increasing both).

LOCAL OPINION SURVEYS

The general trends revealed in the *Life* poll have been supported in local polls. Here are two examples:

In September 1952, a poll conducted in Baltimore, Maryland, revealed that 39.5 percent of PTA members were well satisfied and 53.9 percent were fairly satisfied with their public schools.

The public schools of Denver, Colorado, in 1956 were thought to be doing a good job by 53 percent, a fair job by 35 percent, and a poor job by only 4 percent.

State surveys confirmed these findings. The state and local polls, together with the *Life* poll, clearly indicate that the majority of Americans believe in the type of educational program that they have been developing.

PRACTICAL SUBJECTS

In February 1958, Elmo Roper published the results of a poll which included an inquiry into the relative emphasis on job training and broader subject areas.

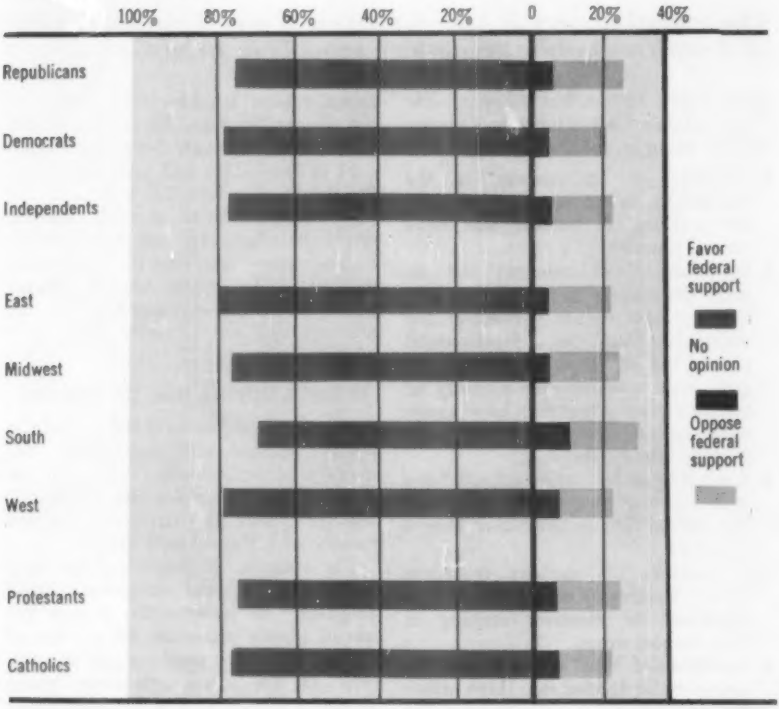
Of those polled, 39 percent favored increased emphasis on job training, and 29 percent favored increased emphasis on the broad, general areas. Twenty percent volunteered the opinion that the present emphasis is satisfactory.

HOW DO THE EDUCATORS FEEL?

The satisfaction expressed by the American public in general is not shared to the same degree by educators. They demand much more.

For details see *Public Opinion Polls on American Education*, NEA Committee on Tax Education and School Finance, 1958. 20 p. Single copy, 15¢; quantity prices.

1 MOST OF US FAVOR FEDERAL SUPPORT FOR SCHOOL CONSTRUCTION



Based on: Gallup, George. "Federal Aid to Schools Backed by 4-to-1 Margin." *Washington Post and Times Herald*. February 10, 1957, p. B8. Copyright, American Institute of Public Opinion (Gallup Poll).

Gallup reported in April 1958 on a nationwide poll of over 1100 high-school principals: 79 percent believed that schools demand too little work of the students, 61 percent asserted that too much emphasis is placed on athletics, and 63 percent believed that students are not required to read enough books.

FEDERAL SUPPORT?

The general public wants the best education for everyone. Educators are even more concerned with the matter of quality. How do the people of America want to pay for the needed improvements?

In the 1950 *Life* poll, of those who had heard of the federal support proposal, 65.4 percent favored it and only 24.0 percent were opposed to it. In February 1957, Gallup reported on a poll concerning federal support for building new schools throughout the country. A margin of 4 to 1 favored such support even though it might mean higher taxes.

The reactions to this question revealed no sharp divergences based on political, regional, or religious differences as shown in the illustration.

In May 1957, Roper reported on a poll yielding results highly similar to those of the Gallup poll. Only 16 percent believed that educational financing should be a local matter entirely, whereas 73 percent believed in federal financial assistance to schools.

LIBRARY SERVICES

The school library is now an integral and universal part of American public secondary schools in urban areas

THE FIRST nationwide study of the secondary-school teacher and library services brought out these facts:

- Virtually all, 99 percent, of the teachers in urban secondary schools are teaching in schools that have central libraries.
- Secondary-school teachers are almost unanimous in the belief that learning how to use various library resources should be a fundamental part of the education of all boys and girls, and a substantial majority of teachers believe that they have a personal responsibility for helping to develop library skills.
- A majority of secondary schools have well-organized programs for developing student skill in the use of library materials.
- A majority of teachers recognize library services as either essential or important to effective teaching in their subject areas.
- Teachers of the various subjects appear to be divided into three rather distinct groups according to the extent to which they utilize library services.
- The school library today not only serves the curriculum needs of students and teachers, but it also provides materials for the professional growth of teachers.

LIBRARY SKILLS ESSENTIAL

Teachers who responded to the questionnaire were almost unanimous in the belief that learning how to use various library resources should be a fundamental part of the education of all boys and girls. Nearly 3 out of 4 believed that they have a personal responsibility for making the development of library skills a fundamental part of the education of pupils in their major teaching area: 98 percent of the English teachers, 92 percent of the social studies teachers, 79 percent of the science teachers, 53 percent of the business education teachers, and 49 percent of the health and physical education teachers believe this way.

About two-thirds of the teachers responding believed that their schools had adequate programs for developing student skills in the use of library materials. However, one-fifth of the teachers did not consider them adequate.

INSTRUCTIONAL USE OF LIBRARY

Almost three-fourths of the secondary-school teachers said they either frequently or occasionally make class assignments that require use of library materials, but the frequency varies greatly with the subjects taught.

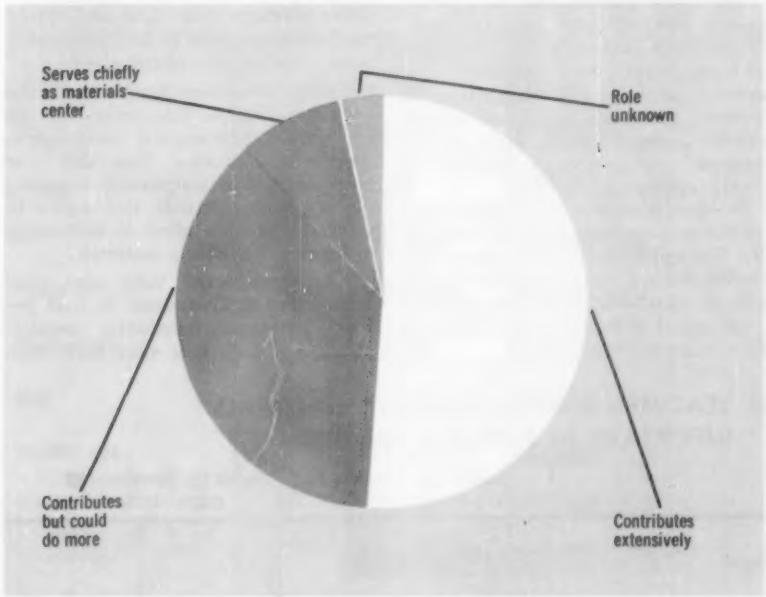
For example, 98 percent of the English teachers make assignments that frequently or occasionally require the use of library materials; 95 percent of the social studies teachers and 86 percent of the science teachers make similar assignments. On the other hand, almost 50 percent of the mathematics teachers and 39 percent of the business education teachers seldom make such assignments.

Almost 8 in 10 teachers reported that they make substantial efforts to motivate and interest students in using library materials.

A majority of teachers, 88 percent, encourage their students to read beyond minimum curriculum requirements. More than 97 percent of the English, social studies, science, and foreign language teachers reported that they either frequently or occasionally encourage their students to do extra

This study by the NEA Research Division, made in co-operation with the NEA-ALA Joint Committee and the American Association of School Librarians, will be reported in full in the fall of 1958.

1 TEACHERS RATE ROLE OF LIBRARY IN INSTRUCTIONAL PROGRAM OF SCHOOL



reading. Similar encouragement is given by 71 to 73 percent of the art, mathematics, and health and physical education teachers.

IMPORTANCE OF LIBRARY MATERIALS

Two out of three teachers considered library materials either essential or important in the effective teaching of their major subject area. Twenty-eight percent of the teachers believed library materials to be of limited importance; only 5 percent, unimportant. Library materials were deemed essential by 75 percent of the English teachers, 58 percent of the social studies teachers, 39 percent of the science teachers, and 35 percent of the music teachers. Eight out of 10 business education teachers and 3 out of 4 mathematics teachers considered library materials to be either of limited importance or unimportant to the teaching of their subjects.

ADEQUACY OF LIBRARY MATERIALS

Well over one-third of the teachers rated the available library materials in their teaching areas only fair or poor. Only one teacher in five rated the materials as excellent; 39 percent rated them good.

When the ratings of excellent and good were combined, English teachers gave the highest ratings with 78 percent scoring their library materials as either excellent or good. Music teachers were second with 69 percent. Sixty-two to 65 percent of the art, social studies, and science teachers gave similar ratings.

Ratings of fair or poor were given the available subject-matter materials by half or more of the business education, industrial arts, and mathematics teachers.

MAJOR USERS OF LIBRARY SERVICES

The study was designed so that responses received from teachers could be analyzed according to 11 major teaching areas. By comparing the answers given by the same group of teachers to several questions, it was possible to obtain a profile of the group's opinions and activities relative to library services.

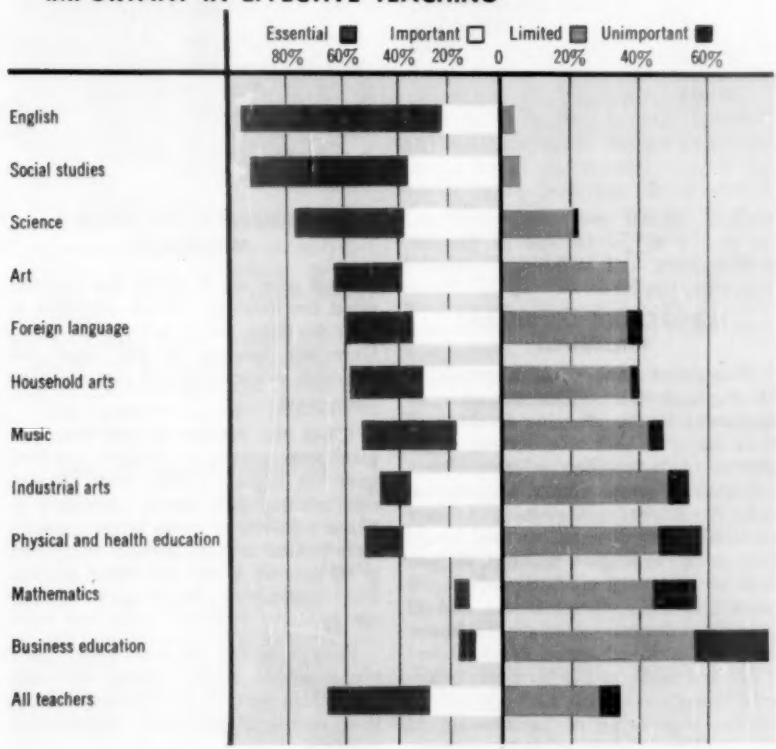
Teachers in three subject-matter areas are the *major users* of library services. The first major user is quite clearly the English teacher. Running a close second is the social studies teacher. And making a very good showing in third place is the science teacher.

Teachers of these three subjects make extensive use of library services as integral parts of their teaching activities. These teachers, more than any others, attribute importance to library materials as essential to their effective teaching.

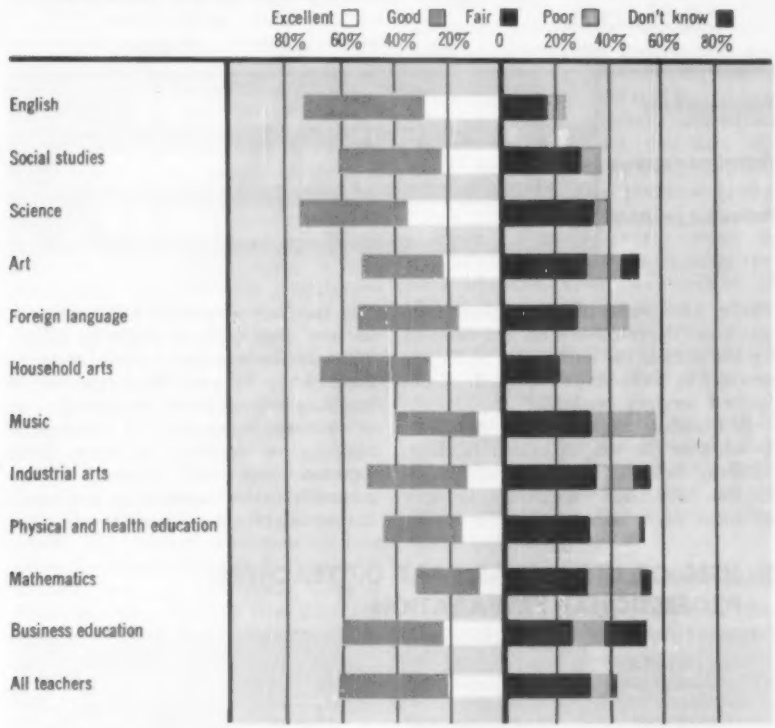
Furthermore, these teachers gave the highest rating to the quality of the materials in their subjects obtainable in their school libraries. They also most often made class assignments requiring use of library materials, and tended to make the greatest effort in motivating students to use library materials.

The three major users also most often encouraged students to read beyond minimum curriculum requirements; and they were more likely than

2 TEACHERS CONSIDER LIBRARY MATERIALS IMPORTANT IN EFFECTIVE TEACHING



3 TEACHERS RATE LIBRARY MATERIALS



teachers in other subject-matter areas to believe that the school librarians encourage students to read in their particular subjects. Moreover, these teachers recommended the largest median number of books for purchase by the school library.

MINOR USERS OF LIBRARY SERVICES

The present minor users of library services are the teachers of business education, industrial arts, and mathematics. As a group, these teachers tend to consider library materials relatively unimportant to the effective teaching of their subjects.

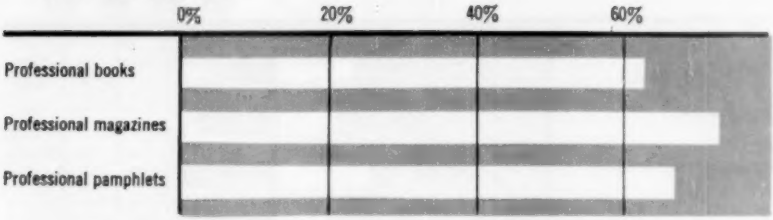
These teachers gave the lowest ratings to the quality of materials available in their subject field. Moreover, they make the fewest assignments requiring use of library services.

Although a very high percentage of these teachers believe that learning how to use various library resources should be a part of the education of all boys and girls, a larger proportion of them believe they personally have little responsibility for making the development of library skills a fundamental part of the education of their students.

Teachers of these subjects tend to make the least effort to interest students in using library materials, and recommend fewer books for purchase than do other teachers.

The relationships shown in the study raise the question: Are the limited

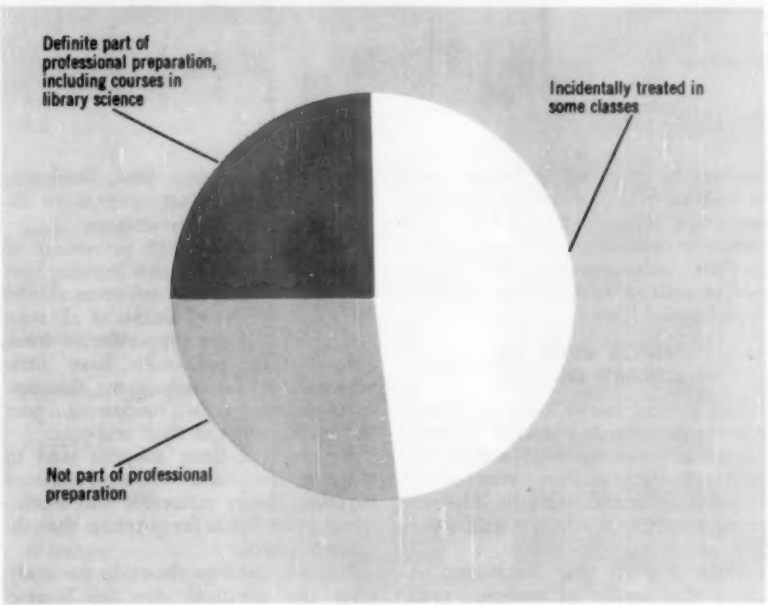
4 SCHOOL LIBRARIES PURCHASE PROFESSIONAL MATERIALS FOR TEACHERS



library services available in these subject areas the result of a limited demand for them, or is the limited use of library services in these areas the result of the limited services available?

A question might also be raised as to whether the subject matter in these teaching fields is as readily adaptable to the utilization of library services as some other subject areas may be. The teachers seemed to believe this to be true. But again, it might be asked: Why do the teachers believe it to be true? Is it because their pattern of teaching has tended to exclude the use of library materials? A substantial minority of teachers in these fields reported that they believe library materials to be essential or important to their effective teaching; 20 percent of

5 USES OF LIBRARY AS PART OF TEACHERS' PROFESSIONAL PREPARATION


Definite part of professional preparation, including courses in library science
Incidentally treated in some classes
Not part of professional preparation

the mathematics teachers stated such a belief. Could it be that these teachers teach in schools where the library has materials especially strong in these teaching areas?

POTENTIAL MAJOR USERS OF LIBRARY MATERIALS

Teachers of art, foreign languages, household arts, music, and health and physical education might be considered as potentially large users of library services. These subjects seem to hold immediate potential for enrichment through better library service.

The data indicate that these teachers believe library materials are rather important to their effective teaching. On the other hand, many of these teachers gave rather poor ratings to the materials in their subject areas currently obtainable in their school library. For example, approximately 45 percent of the foreign language, household arts, and health and physical education teachers rated the library materials in their fields as only fair or poor. However, many of these teachers reported that they frequently require their students to use library materials.

Foreign language teachers ranked fourth in the frequency with which they make class assignments requiring the use of library materials, with 72 percent of them making either frequent or occasional assignments. Sixty-six percent of the household arts teachers and 57 percent of the health and physical education teachers make such assignments either frequently or occasionally.

In addition, foreign language and household arts teachers ranked fourth and fifth, respectively, in feeling personal responsibility for making the development of library skills a fundamental part of the education of students. Seventy-one percent of the foreign language teachers and 58 percent of the household arts teachers reported feeling a similar responsibility. Art teachers ranked fourth and household arts teachers ranked fifth in the median number of books recommended for purchase by the school library.

A RESOURCE TO TEACHERS

Many school libraries are more than materials centers for students; they are also centers for professional materials for teachers. Seventy-two percent of the teachers reported that their school libraries regularly purchase professional magazines; 63 percent, that they regularly purchase professional books; and 67 percent, that they purchase professional pamphlets.

School librarians often serve as consultants to teachers in planning new units of work. Over two-thirds of all the teachers responding to the questionnaire said they either frequently or occasionally consult their librarian, while only 16 percent said they never consult the librarian.

Almost three-fourths of the teachers reported that they had received either no instruction or only incidental instruction in the role and function of the school library as a part of their professional training in college.

PURCHASE OF LIBRARY MATERIALS

Nine in 10 teachers reported that their school librarians have an annual allotment in the school budget for the purchase of new library materials. Many teachers participate in the selection of materials to be purchased. One-fifth of the teachers reported that in the previous 12 months they had recommended 15 or more books to the school librarian for purchase. The median number of books recommended by all teachers was 5.9.

When asked what action was taken on the majority of books recommended by the teachers for purchase by the librarian, 89 percent of all the teachers who had made recommendations during the previous year said the books were either purchased at once or placed on a list for early purchase. Sixty-six percent said that their recommended books were purchased promptly, while only 3 percent said that no action was taken. This promptness in honoring the requests of teachers seems to be at least one factor contributing to teacher satisfaction with library services.

EDUCATIONAL ATTAINMENT OF AMERICANS

Education pays off in higher incomes for workers

THE AVERAGE educational level of American adults increased more than one full year between 1950 and 1957, and nearly two years since 1940. The young adult has an average of four years more schooling than his grandparents, and is likely to pass his father in earning ability. These and many other facts about the educational progress of Americans were documented in three recent reports of the U. S. Bureau of the Census.

As of March 1957, persons 25 years of age and older had completed a median of 10.5 years of schooling. Women had a half-year edge on the men.

1 THE LEVEL OF SCHOOLING RISES

Date of survey	Median years of school completed	
	Men	Women
April 1940	8.6	8.7
April 1950	9.0	9.6
March 1957	10.3	10.9
Increase 1940 to 1957	1.7	2.2

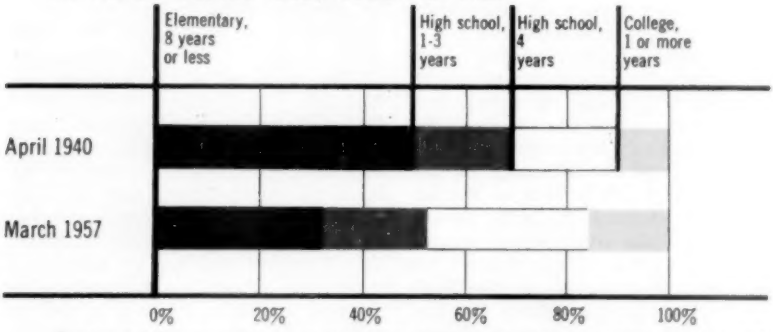
Source:
U.S. Department of Commerce, Bureau of the Census. *Educational Attainment: March 1957.* Current Population Reports, Series P-20, No. 77. Washington, D.C.: the Bureau, December 27, 1957. Table A, p. 1. Men and women 25 years old and older.

ATTAINMENT BY AGE GROUPS

Our recent progress as an educated people is reflected in the average levels of schooling completed by different age groups. The median school years completed for each adult age group is higher than that of each older group:

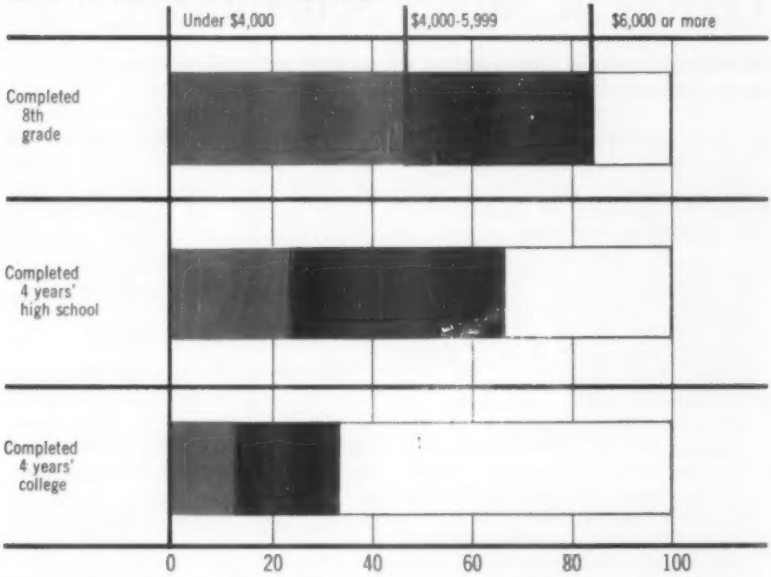
- The median level of schooling of those aged 25 to 29 years was just in excess of the fourth year of high school.
- The median level of those aged 45 to 54 years was about the completion of the second year of high school.
- The median level of those aged 65 years and older was just in excess of eight elementary grades.

2 EDUCATIONAL ATTAINMENT OF WORKERS 18 TO 64 YEARS OLD, 1940 TO 1957



Based on: U. S. Department of Commerce, Bureau of the Census. *Educational Attainment of Workers: March 1957.* Current Population Reports, P-50, No. 78. Washington, D.C.: the Bureau, November 1957. Table A, p. 1.

3 IT PAYS TO GO TO COLLEGE!



Based on: U.S. Department of Commerce, Bureau of the Census. *Educational Attainment: March 1957.* Current Population Reports, Series P-20, No. 77. Washington, D.C.: the Bureau, December 27, 1957. Table F, p. 5. Men 35 to 54 years old.

WORKERS 18 TO 64 YEARS OLD

Rapid gains have been made in the educational level of the nation's labor force, aged 18 to 64 years, since 1940:

- Workers with four years or more of college have increased from 6.4 percent of the labor force in 1940 to 9.2 percent in 1957.
- Workers with less than five years of schooling have decreased from 8.7 percent of the labor force in 1940 to 5.6 percent in 1957.
- The average school years completed by members of the labor force have increased from 9.3 in 1940 to 11.8 in 1957.

Illustration 2 shows the proportion of the labor force at different levels of education in 1940 and in 1957.

EDUCATION AND INCOME

Recent figures on income and education give additional evidence that the income of the worker rises with his educational level. In 1956, men workers 14 years of age and older with an eighth-grade education and working full time had a median income of $4035; with a four-year college education, $6980. Women full-time workers with an eighth-grade education had a median income of $2408; with a four-year college education, $3809.

Two-thirds of the men 35 to 54 years old, with a college education and working full time, had incomes of $6000 or more.

Women full-time workers 14 years of age and older who had completed four years of college had a median salary 58 percent higher than the women who had completed only the eighth grade and 26 percent higher than the women who had completed only high school.

For details see U. S. Department of Commerce, Bureau of the Census. Current Population Reports, Series P-20, No. 77; P-50, No. 78; P-60, No. 27.

Trends in Salary Schedules

Salary schedule provisions of urban school districts show general progress over the past 11 years

IN 1947 the NEA Research Division reported a detailed analysis of single-salary schedules. A similar study conducted by the Research Division this year revealed the following facts:

- The lowest and the highest levels of training recognized by salary schedules have progressed upward.
- The number of salary classes per schedule has remained at a median of about four classes.
- The size of salary increments has increased while the number has decreased.
- The number of years of prior teaching experience recognized for salary credit has increased.
- About the same proportion of schedules include requirements for continued professional study.
- More and more schedules include provisions for administrators' salaries.

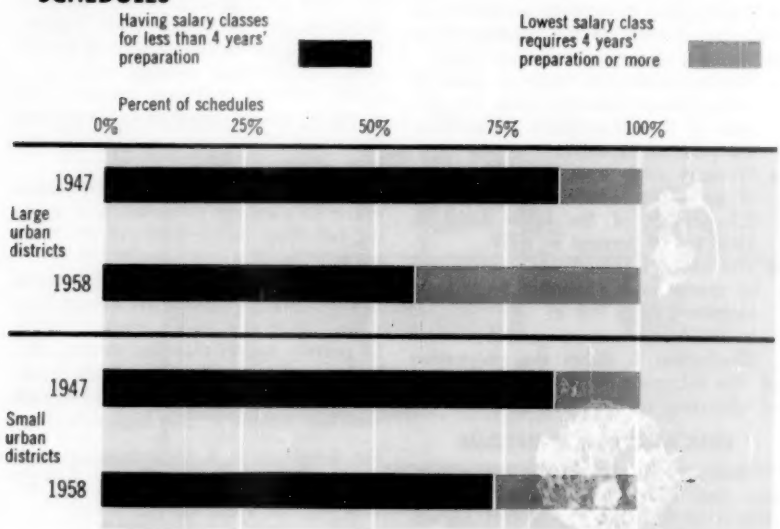
Schedules from urban districts of 30,000 population and over are reported upon as "large districts." The "small districts" are those of 5000 to 10,000 population. Only the schedule documents were examined; no questionnaire information was available.

LEVELS OF TRAINING

The number of schedules that recognized training of less than four years of college decreased. In 1947, about 85 percent of the salary schedules of both large and small urban districts had one or more salary classes for teachers with less than four years of

More details will appear in the full report to be published by the Research Division in the fall of 1958.

1 LOWEST LEVEL OF PREPARATION RECOGNIZED BY SALARY SCHEDULES



college. In 1958, only 57.1 percent of the large urban districts and 73.3 percent of the small urban districts recognized training below four years.

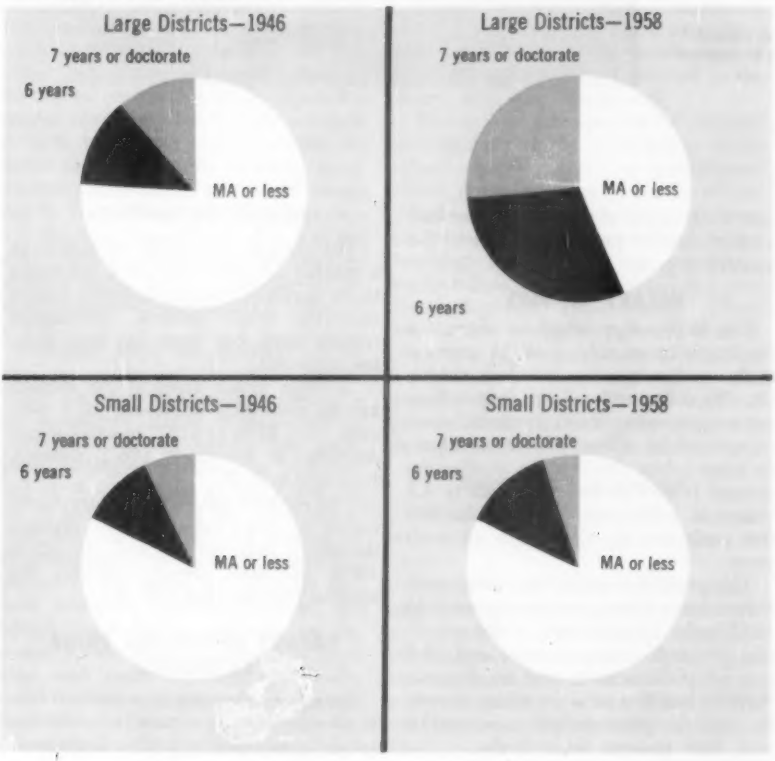
In 1947, salary classes for teachers with no more than two years of training were found in the schedules of 40.7 percent of the large districts; in 1958 the corresponding figure was down to 23.3 percent. In the small districts, however, the proportion remained constant at about 38 percent.

The highest levels of training recognized by the salary schedules ranged from four years or bachelor's degree through various levels to that of an earned doctorate. The preparation level recognized as highest more frequently than any other, by both groups of districts and in both years, was "master's degree, no equivalent mentioned."

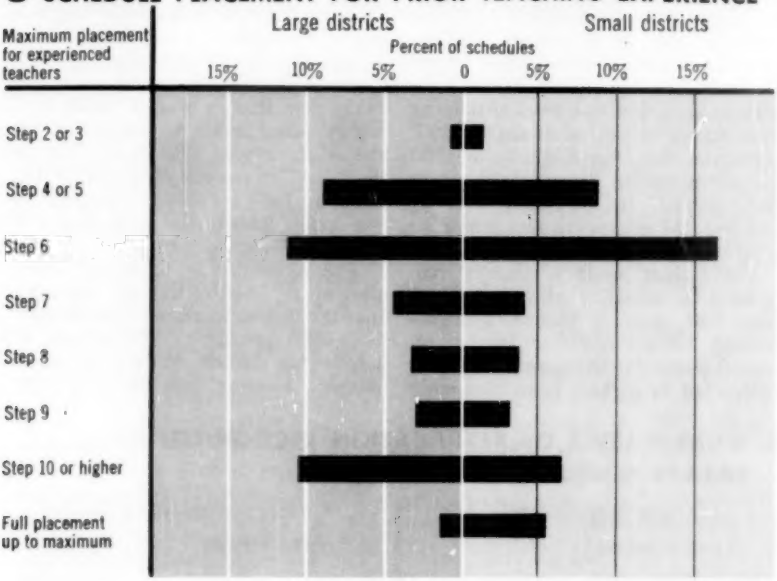
A year's credits beyond the bachelor's degree, without a master's degree, is less likely than it once was to result in a higher salary level. An equivalent for the M.A. degree was recognized in 1947 by 17.2 percent of the larger districts; in 1958 by only 3.4 percent. In the small districts the proportion fell from 28.8 to 4.1 percent.

The proportion of salary schedules recognizing levels of training above the master's degree increased substantially, from 24.3 percent to 57.7 percent in large urban districts. In the small urban districts, however, only about 19 per-

2 HIGHEST LEVEL OF PREPARATION RECOGNIZED BY SALARY SCHEDULES



3 SCHEDULE PLACEMENT FOR PRIOR TEACHING EXPERIENCE



cent of the schedules in either year had a salary class for preparation beyond the master's degree.

SALARY CLASSES

The 1958 salary schedules show, for the larger cities only, a slight increase in the median number of salary classes, i.e., the different levels of preparation, each representing a full academic year, recognized for different levels of salary. In large urban districts the median increased from 4.0 classes in 1946 to 4.1 classes in 1958; in small urban districts the median was 4.1 classes in both years.

The percent of salary schedules with five or more salary classes increased. In 1947, only 19.3 percent of the schedules of large urban districts and 11.6 percent of the schedules of small urban districts had five or more salary classes. In 1958 the percents had risen to 22.6 and 16.6 percent respectively.

SALARY INCREMENTS

The annual increment in salary as a teacher advances from the minimum to the maximum has traditionally been a relatively small amount. Increments remain small, but there has been some improvement.

In large urban districts, the median annual increment increased 63.7 percent, from $102 to $167. In small urban districts, it increased 106.1 percent, from $66 to $136.

The median *number* of salary increments in large urban school districts decreased from 13 in 1947 to 12 in 1958. In small urban districts, the median number remained at 11.

SALARY CREDIT FOR PRIOR EXPERIENCE

By common practice, a teacher who is new to a local system but who has taught previously is paid a higher sal-

ary than the inexperienced new teacher receives. The amount of placement given for experience, however, varies widely.

The proportion of salary schedules with specific regulations for crediting previous teaching experience increased from 20.7 percent in 1947 to 42.8 percent in 1958 in large urban districts and increased from 24.0 percent to 45.9 percent in small urban districts.

A number of other schedules—6.2 percent of those in large districts and 7.6 percent in small districts—state that experience is to be recognized but leave the details flexible.

Close to half of the schedules in both large and small districts were worded so that a record could be made of the highest salary step on which a newly appointed, experienced teacher could be paid. The sixth step—the same salary as paid to a teacher who had completed five years of local experience and was beginning the sixth year—was the one salary step mentioned most often as the highest on which a newly appointed teacher could be placed. This was true of both large and small districts. As shown in illustration 3, however, many schedules authorized placement above step 6. The median placement was step 7 in the large districts and step 6 in the small districts. For both groups this represented higher levels of placement for experienced teachers than were reported in 1947.

Different kinds of previous experience are recognized for salary credit. Credit for previous teaching experience was sometimes limited to public-school experience. Military service was mentioned as being acceptable in 24.4 percent of the schedules of large districts and in 18.0 percent of the schedules of small districts. In 1947, 3.6 percent of the schedules of large districts and 1.0 percent of the schedules of small districts accepted military service. Although these figures indicate an increase, a few salary schedules of both large and small districts specifically stated the discontinuance of the practice of crediting military experience in the placement of new teachers. Acceptance of nonteaching service related to teaching assignment decreased in both large and small districts.

PROFESSIONAL-GROWTH REQUIREMENTS

Some schedules include a condition that the annual increments will be granted only to teachers who present evidence of continued professional growth. A typical requirement is that at least every five years the teacher complete six semester hours of college study.

About a fifth of the large districts and about a fourth of the small districts include such requirements in their schedules. For the larger districts this was a slight decrease from 1947—down from 23.6 to 18.8 percent. In the smaller districts the slight change was upward, from 26.0 to 26.8 percent.

These percents doubtless understate the extent of such requirements as they may be matters of state certification or local policy that are not restated in the salary schedule documents.

Professional activities that would add to a teacher's ability to contribute to the school system, such as educational travel, research writing, work for educational and community organizations, and outside employment related to the teaching assignment, are sometimes evaluated as partially meeting the professional-growth requirements. There has tended to be a slight increase in accepting such equivalents. Most often recognized is educational travel; 8.5 percent of the large districts and 9.6 percent of the small districts mention it as a partial equivalent for study.

PERSONNEL COVERED

Generally, salary schedules include more school positions in 1958 than in 1946.

Almost three-fourths of the salary schedules of the large urban districts and one-third of the salary schedules of small urban districts included provisions for salaries of administrators as well as classroom teachers. The percents were somewhat higher in 1958 than in 1947.

Do you as a principal or classroom teacher have legal authority to administer

Corporal Punishment?

WHETHER or not teachers should administer corporal punishment upon their pupils was much debated in the past among teachers, parents, and the general public. Even yet, the question sometimes arises. The problem goes beyond the realm of academic discussion when it reaches the courts, as it does from time to time. It then becomes important for all teachers to know where they stand legally. The cases dealing with corporal punishment that are brought against teachers are of three types:

- The teacher is indicted for criminal assault upon a pupil.
- The teacher is made defendant in a civil action for assault and battery.
- The teacher is dismissed because of alleged cruelty in the administration of corporal punishment.

LAWS AND SCHOOL BOARD RULES

So far as it is known, only the District of Columbia and New Jersey prohibit corporal punishment by statute. A Rhode Island law may be similarly interpreted although corporal punishment is not specifically mentioned.

Almost all states have laws forbidding cruelty to children (sometimes merely included in provisions against cruelty to animals!). If corporal punishment administered by a school teacher be excessive or administered with a dangerous instrument or in an improper manner, the teacher is liable to apprehension under such laws.

Many local school board rules prohibit or set up procedures for administering corporal punishment, but these regulations apply only locally.

At least nine states indirectly sanction moderate and reasonable corporal punishment by making an exception in the definition of assault and battery when a teacher uses force on a pupil. These statutes show that under certain circumstances corporal punishment would be considered assault and battery.

Corporal punishment was the subject of legislation in 1958. The Virginia legislature passed a bill permitting principals and teachers to administer reasonable corporal punishment upon a pupil, provided the teacher acts in good faith and that the punishment is not excessive.

COURT DECISIONS

Since 1833, about 59 cases have been brought against teachers in courts of record because they administered corporal punishment. Almost all of these were cases of assault and battery, but a few were dismissal cases where the ground for dismissal was the misuse of corporal punishment. The majority of the cases were heard before 1900. Two cases arose in the 1920's; two in the 1930's; 11 in the 1940's; and six in the 1950's. These cases have arisen in 21 states.

Most courts have decided in favor of the teacher under the common-law rule that he stands *in loco parentis*, that the punishment was justified by the behavior of the pupil, and that it was not unreasonable, excessive, or malicious.

In loco parentis, under common law, means that the teacher has the legal status of a conditionally privileged person "in place of the parent." The parent has wider privilege than the teacher since the teacher is limited to situations within his jurisdiction and responsibility as a teacher. The parent and the teacher *in loco parentis* are privileged to certain conduct under cer-

For details see *The Teacher and the Law*, to be published by the Research Division in the fall of 1958.

tain circumstances for certain purposes. This privilege includes physical chastisement or other forms of punishment for the purpose of enforcing reasonable discipline. If a teacher exceeds his limited privilege, he may be liable not only criminally but also civilly in tort action for assault and battery.

If the number of court cases can be taken as an indication, it seems that corporal punishment upon pupils is becoming less prevalent. Nevertheless, every year or so a teacher is indicted for criminal assault, or made a defendant in a civil action for assault and battery, or given notice of dismissal on the ground he administered corporal punishment.

EXCESSIVE OR MALICIOUS PUNISHMENT

Cases which were decided against the teacher were based often upon one of two factors: Either the punishment was excessive or it was malicious or, in some instances, it was both.

Excessive punishment is discussed in section 150 of the *Restatement of the Law of Torts*:

> In determining whether a punishment is excessive, the nature of the offense, the apparent motive of the offender, the influence of his example upon other children of the same family or group, the sex, age, and physical and mental condition of the child, are factors to be considered.[1]

The courts have considered the following actions by a teacher administering corporal punishment to be excessive or malicious.

- Teacher beat, bruised, cut, and gashed a pupil's head. (1853)
- Teacher punished a 15-year-old pupil twice with paddle made of flooring. (1940)
- Principal dragged a 10-year-old pupil to floor and sat and knelt on pupil, exerting weight on pupil's abdomen. (1944)
- Teacher and principal severely beat a 12-year-old pupil. (1954)

These examples show that the courts will quickly condemn unreasonable and cruel punishment. Any good teacher would condemn it also. Teachers and courts agree that corporal punishment, when administered, should be administered reasonably.

REASONABLE AND PROPER PUNISHMENT

If there are laws or board rules which prohibit corporal punishment or prescribe its administration, the teacher must obey them. If there are no laws or regulations, there are certain criteria which courts have laid down in determining whether corporal punishment is reasonable or not. On the basis of these criteria, the courts determine whether the case is to be decided for or against the teacher.

The characteristics of reasonable corporal punishment have been listed by Sumption[2]:

- It is in conformance with statutory enactments.
- It is for the purpose of correction without malice.
- The pupil knows wherein he has erred and is thus aware of the reason for the punishment.
- It is not cruel or excessive and leaves no permanent mark or injury.
- It is suited to the age and sex of the pupil.
- It is administered in the pupil-teacher relationship.

The teacher or principal who, in the rare circumstances when it seems appropriate, administers corporal punishment should remember these criteria.

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[1]American Law Institute. *Restatement of the Law of Torts*. Vol. I: "Intentional Harms to Persons, Land, and Chattel." St. Paul, Minn.: American Law Institute Publishers, 1934. Chapter 6, Topic 2. Copyright 1934 by the American Law Institute. All rights reserved. Reprinted from Restatement of the Law of Torts as adopted and promulgated by the American Law Institute at Washington, D. C., May 10-12, 1934.

[2]Reprinted by permission from *Law and Contemporary Problems*, published by the Duke University School of Law. Winter 1955, Vol. 20, No. 1 (p. 89). Copyright, 1955, by Duke University.

SALARIES IN HIGHER EDUCATION

take on new interest for public-school teachers as colleges and universities draw more and more upon the public-school staff for their new instructors

ONE OF every eight new college teachers was a high-school teacher the preceding year according to a recent study by the NEA Research Division. Another 1 in 10 came from school administration, elementary-school teaching, junior-college teaching, or some other closely related educational service. This means, literally, that a new rung is being added to the ladder of professional progress for career teachers.

For several decades the Research Division has conducted studies of salaries in the public schools. More recently the expanding program of research has prepared the way for the development of a similar foundation at the higher-education level. In this way the financial needs of the entire educational structure can be more clearly presented to the public.

The third biennial nationwide study of college and university salaries brings out these high lights:

- The top instructional salaries are quite rewarding; a few professors receive $18,000 or more for nine months of teaching service; some 2000 receive $12,000 or more; as many as 5500 receive $10,000 or more for the academic year.
- Most of the top professorial salaries are paid in the universities, but the top salary in a nonpublic college goes as high as $16,000, in a state college as high as $13,000, and in a teachers college as high as $11,500.
- The median for college teachers of all ranks is $6015; for full professors the median is $8072, but for the lowest rank—instructors—it is only $4562.
- At the bottom of the scale is 1 of every 10 teachers (all ranks) at no more than $4400; 1 of every 4 is not above $5000.
- The top salary reported paid to a president is $45,000; to a dean, $27,500; to a business manager, $24,500; to a director of athletics, $23,500; to a dean of women, $12,500.
- Some college presidents receive as little as $4300 for a full year of service; holders of many other administrative positions receive less than $4000.

The report shows the salary status of each of 90,276 full-time teachers in 772 institutions. These teachers are shown separately in each of the four professorial ranks, in each of 11 types of institutions, and in each of eight geographic regions. Thus, a teacher of any rank anywhere in the nation may see where he stands in comparison with others of the same rank in the same kind of institution.

Illustration 1 provides a broad overview of median instructional salaries. In colleges and universities the median for all ranks—$6015—many be compared with the median of $5996 in all junior colleges and the median of $4520 in the public schools.

VARIATIONS BY REGION

The highest median—$7911—is paid in municipal universities, while the lowest median—$4610—is paid in small nonpublic colleges. But geographic location exerts an important influence, too. Considering all types of institutions together, the median salary for all ranks combined is $6682 in the Far West, $6253 in the Middle Atlantic, $6160 in

For more details see *Salaries Paid and Salary Practices in Universities, Colleges, and Junior Colleges, 1957-58.* Research Report 1958-R1. May 1958. 56 p. $1. Single copy free upon request to the Association for Higher Education by members of that NEA department.

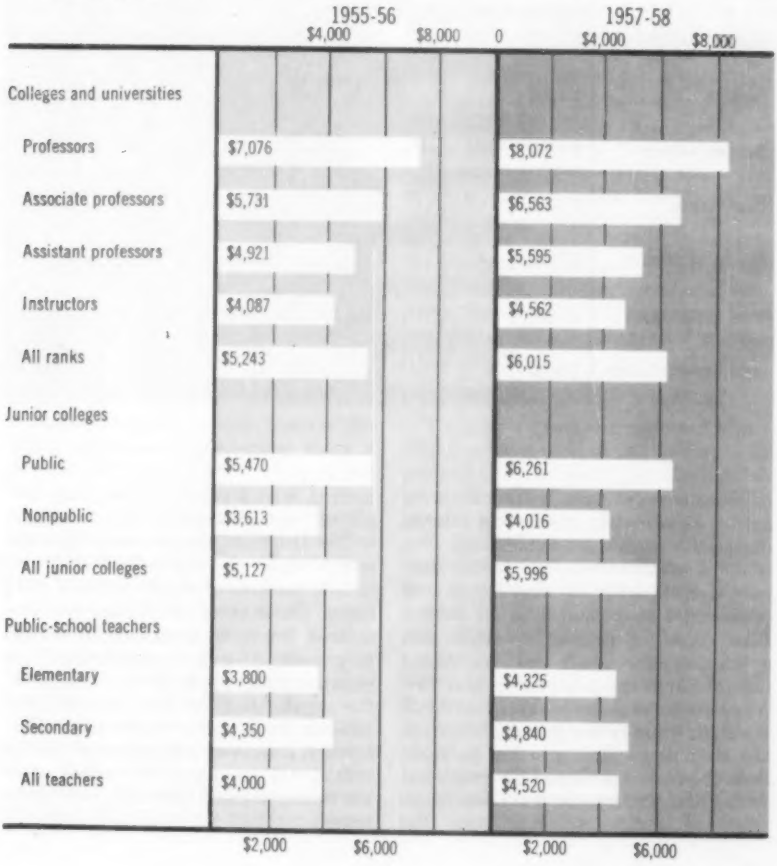
New England, $6137 in the Middle states, $5576 in the Southwest, $5560 in the Northwest, and only $5374 in the Southeast. The range represents an extreme difference of $1308 in median salary.

SUMMER EMPLOYMENT

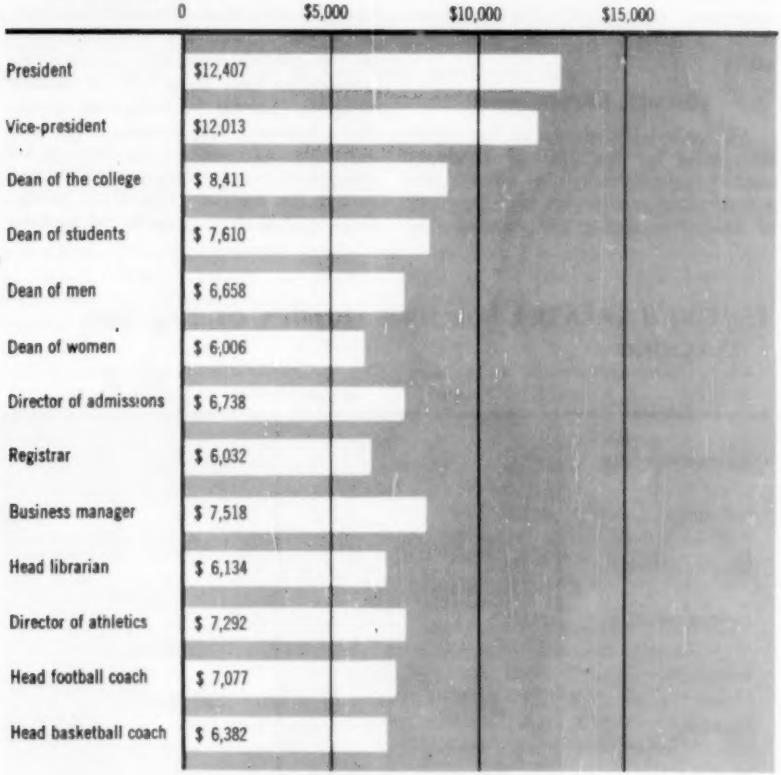
All the salaries shown in the report were paid for the 1957-58 academic year of approximately nine months. But a good many institutions offer programs of instruction during the summer. The report shows (a) the extent to which full-time staff members have this opportunity for additional employment and (b) rates of pay for such service.

In general, it may be said that almost all the publicly supported colleges and universities offer some kind of summer program. Among the nonpublic institutions, however, the practice varies considerably. As many as one-third of the smaller nonpublic colleges remain closed during the summer. And these institutions least likely to provide any summer

1 MEDIAN SALARIES FOR NINE MONTHS OF FULL-TIME TEACHING



2 MEDIAN SALARIES OF COLLEGE ADMINISTRATIVE OFFICERS, 1957-58



employment are usually found to be among those paying the lowest salaries during the regular academic year.

But a scheduled summer session does not mean extra employment for all staff members. Fewer than 1 in 25 institutions (only 3.8 percent) provides this opportunity for all its teachers. About one-fourth of the institutions give employment to as many as three-fourths of the staff, while as many as one-fourth of the institutions have use for no more than one-fourth of those fully employed during the nine-month year. Among all types of institutions combined, the median is 51.4 percent of the staff employed during some part of the summer.

The length of these summer sessions varies widely from one four-week session to sessions of eight weeks or even more. The custom of offering two sessions of five or six weeks each seems to be growing. In such cases, however, it is common custom to employ a member of the regular staff for only one of these sessions. In those few institutions offering a full three-month summer term it is the usual practice to limit a staff member to one of these full terms each three years.

Another limitation of summer earnings is in rate of pay. Almost one-half the institutions offering summer programs pay for teaching service at a *lower rate* than during the regular year. In numerous instances the compensation is determined by the number of students enrolled in the courses taught or the number of credit hours granted.

The most significant limitation, however, shows up in the choice of subjects by summer-session enrollees. A majority of them are preparing for elementary- or high-school teaching, and thus tend to concentrate heavily in certain fields. This means that teachers in these fields are most likely to have summer employment opportunities, while teachers in other fields are almost completely eliminated from this chance to supplement their nine-months' earnings.

Readiness to accept summer employment, whether on the home campus or elsewhere, is conditioned by the adequacy of the individual staff member's preparation. In recent years the colleges have employed larger numbers of new teachers who are far below the desired standard and who thus face the necessity of returning to student status themselves during the summers. Of the most recently employed group almost one-fourth entered full-time college teaching before they had earned the master's degree.

MANY PART-TIME TEACHERS

Unlike the public schools, some of the higher educational institutions carry a considerable part of their instructional load with part-time employees. This practice is most prevalent, of course, in the universities serving many graduate students. It is common practice to employ large numbers of these advanced students to teach the lower-level classes. Again, institutions in populous centers have opportunity to employ on a part-time basis a good many persons regularly engaged in other occupations.

One large university reported 1800 part-time teachers. Two others employ more than 1000 each; 13 others, between 500 and 999; 13 others, between 300 and 499; 21 others employed more than 200 part-time teachers each during the 1957-58 year. Reliable data are not available concerning the salaries paid to these persons who supplement the full-time teaching staff.

JUNIOR-COLLEGE SALARIES

With junior colleges carrying a substantial part of the total college load in some states and practically none in others, wide differences in salaries paid can readily be attributed to regional influences.

Public junior colleges in the Far West employ about one-half of those reported throughout the nation. The median salary in that group is $6774, compared with a median of $6446 in the Middle Atlantic, $6143 in the Middle states, $5115 in the Southwest, $4929 in the Northwest, $4800 in New England, $4282 in the Southeast, and a nationwide median of $6261. A few individual salaries in public junior colleges go up to $10,000, with about 10 percent being above $8000.

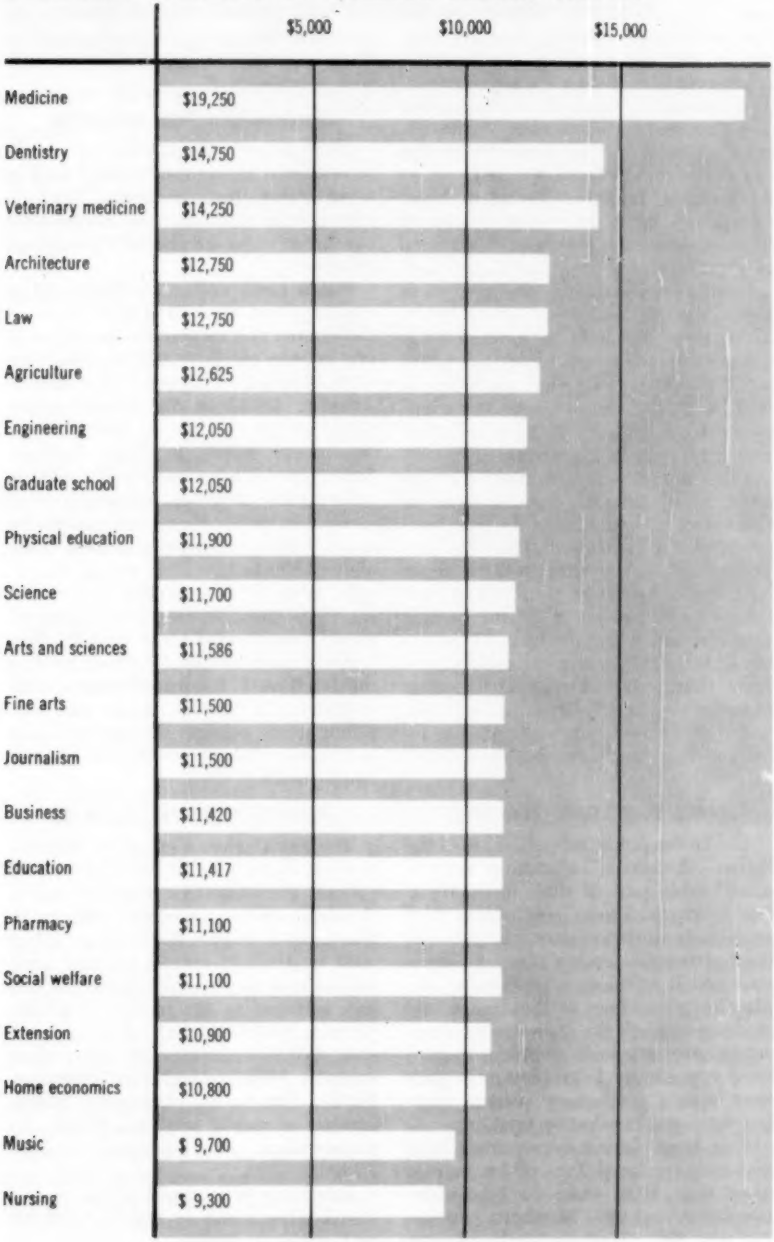
In general, the nonpublic junior colleges pay lower salaries. The highest regional median—$4843—is paid in New England; the lowest—$3322—is paid in the Northwest. The nationwide median is $4016. In both the public and nonpublic junior colleges the teachers have less than a fifty-fifty chance for summer employment.

ADMINISTRATIVE SALARIES

The report gives a complete distribution of salaries paid to the holders of 22 general administrative positions and to the deans of 21 professional schools. Illustration 2 shows the median salary paid in 1957-58 for 13 selected positions. Other median salaries for 1957-58 are: assistant to the president, $7850; provost, $14,500; dean of administration, $10,450; director of audio-visual services, $6900; director of extension, $8083; director of placement, $6494; director of public relations, $6420; superintendent of laboratory school, $7300.

Salaries paid to deans of the professional schools run as high as $30,000 and as low as $6000.

3 MEDIAN SALARIES OF COLLEGE DEANS, 1957-58



INCREASES SINCE 1955-56

In each of the past two years the rate of increase in all instructional salaries varied considerably by type of institution as these percents show:

Type of institution	*Median percent of increase 1955-56 to 1956-57*	*1956-57 to 1957-58*
State universities	5.4%	10.4%
Nonpublic universities	8.5	7.2
Municipal universities	6.7	8.0
Land-grant colleges	5.2	10.4
State colleges	5.9	10.4
Teachers colleges	6.0	10.3
Nonpublic colleges: (by enrollment)		
1,000 and over	8.6	7.8
500-999	7.9	6.9
Under 500	5.9	6.0
All types combined	6.9%	8.2%

There was, of course, wide variation among the institutions in each group. For example, in 1956, 1 of every 8 state universities granted no increases, while in 1 of every 12 the increase was as much as 20 percent.

In 1957 the increases in each group of public institutions exceeded those of the preceding year; in the larger nonpublic institutions the reverse was the case. The small nonpublic colleges generally averaged a 6-percent increase each of the last two years.

SALARY SCHEDULES

Teachers in the public schools know very well the meaning of the term *salary schedule*. The two minimum elements are (a) designated entering salaries geared to the level of the applicant's formal preparation and (b) designated steps for advancement geared to experience and improvement of preparation. Only about 29 percent of the colleges, however, have adopted such regularized procedures. The practice is found most frequently in teachers colleges.

About 39 percent of all reporting institutions have on record a statement of general policy concerning salaries, but a schedule of increments is not included. Almost 15 percent indicated that the development of a schedule is contemplated.

In one of the major universities a joint committee of administrative officers, teachers chosen by the entire staff, and members of the board of control has developed a policy with this encouraging provision: The ultimate salary of the full professor shall be three times the established base for beginning full-time staff members. The intent of this provision is to give substantial encouragement to career teachers. This progressive step is a goal yet to be achieved in the further development of public-school salaries.

Just now all institutions of higher education, like the public schools, are hampered by a shortage of really qualified, competent candidates for teaching positions. And like the public schools, the colleges and universities find the shortage much more acute in certain fields than in others. Thus, in the effort to develop and operate an equitable salary schedule, this question arises: Has this selective shortage forced the colleges (a) to offer a higher beginning salary, or (b) to elevate the vacant position to a higher rank in order to attract candidates in certain fields? And if so, in what fields?

Institutions of all types have resorted to one or both of these practices. Science is the most frequently mentioned field, followed by mathematics, engineering, business, education, economics, and English, in that order.

STAFF EXPANSION

Without doubt during the next decade the enrollment in institutions of higher education will increase *faster* than enrollment in the public schools. This means an enormous expansion in the teaching staff. And, encouragingly, some of the universities are now beginning to organize programs *for the preparation of college teachers*. Teachers specifically trained for college teaching will improve the quality of instruction, add to the prestige of the profession, and extend the opportunities of advancement.

CORRECTIONS FOR PAGES 68 AND 69

The percents shown in the charts on these pages do not correspond with the sizes of the shaded areas of the circles. Printed percents of high-school graduates completing various numbers of years of mathematics and science *are correct;* the sizes of shaded areas *are not*.

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